

REMARKS

Claims 1, 3-23 and 31-34 are pending in the application.

It is noted that claim 1 substantially correspond to the claim recently allowed by the European Patent Office in the related European case. For the Examiner's convenience, Applicant submits a copy of the relevant Communication from the EPO (under Rule 51(4)) indicating that the patent intends to grant the related European patent. Exhibit A..

Claims 1, 3-23, and 31-34 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner asserts that the limitations "to only a single flexible substrate" (claim 1) and "a support consisting of a single flexible substrate" (claim 34) are not supported by the disclosure as originally filed.

Claims 1, 3-9, 11, 12, 22, 23, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) in view of Maynard (US 6541149) and Marchetti (US 6503654). Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) and Marchetti (US 6503654) as applied to claim 1 above and incorporated herein, and further in view of Narayanan (US 6432284). Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) and Marchetti (US 6503654) as applied to claim 1 above and incorporated herein, and further in view of Hinokuma (US 2003/0013003). Claims 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 2002/0182475) and Maynard (US 6541149) and Marchetti (US 6503654) as applied to claim 1 above and incorporated herein, and further in view of Shiue (US 6500575).

For the following reasons, Applicants respectfully submit that the application is in condition for allowance.

With respect to the § 112 (first paragraph) rejection, Applicants respectfully disagree with this rejection. In particular, in rejecting the claims based on § 112 (first paragraph), the Examiner states that the polymer protective layer RP in Fig. 3 of the subject application reads on the flexible substrate so that the cells are in contact with two substrates RP and 21 in Fig. 3. However, Applicants respectfully disagree with the Examiner's interpretation of the specification. The specification consistently refers to reference number 21 as the "flexible supporting film". In contrast, the layer RP is consistently identified as a protective layer, which is distinguishable from the claimed flexible substrate. Accordingly, it is believed that a person of ordinary skill in the art when reviewing the specification would understand that there is only one flexible substrate corresponding to the film 21 and that the protective layer RP is unrelated to the claimed flexible substrate. Nonetheless, to advance prosecution and without prejudice, Applicants have amended claim 1 by deleting the term "only" and have canceled independent claim 4 from the application. Thus, it is requested that this rejection be withdrawn.

Turning to the prior art rejection, it is noted that claim 1 has been amended to include the limitation of claim 4 which has been canceled. It is submitted that claim 1 is patentable over the prior art for the following reasons.

Concerning the rejection under 35 USC § 103, the Examiner is now citing Marchetti as a new reference. The Examiner combines:

- i) Pan, Maynard and Marchetti to reject claims 1, 3-9, 11, 12, 22, 23, 31-34;
- ii) Pan, Maynard, Marchetti and Narayanan to reject claims 10 and 14;
- iii) Pan, Maynard, Marchetti and Hinokuma to reject claim 13;

iv) Pan, Maynard, Marchetti and Shiue to reject claims 15-21.

Thus, depending upon the case, the Examiner requires three or four references for rejecting a claim, based on the simple reason that all documents relate in some way to fuel cell: all these rejections are based on a wrong interpretation of Pan, as explained hereinafter.

In the first part of page 5 of the Office Action the Examiner states that “*Pan discloses delivery means for delivering a fuel [cell] to each cell and discharge means for emptying water from each cell*”. This statement, as such, does not constitute a sufficient substantiation of the rejection of claim 4 (now incorporated into claim 1). Indeed, the feature recited in claim 4 is never dealt with in detail in the Office Action.

According to amended claim 1, a second duct is also associated in an irremovable way to the *single flexible substrate* and this additional duct is connected to the plurality of cells for emptying water from each cell. Thus, according to claim 1, the first duct for the fuel and the second duct for water emptying are associated with the same flexible substrate.

As mentioned, the Examiner did not substantiate the rejection against claim 4. As such, the Examiner has failed to establish a *prima facie* case with respect to claim 1, as amended. Additionally, Pan does not disclose or suggest a duct for fuel and a duct for water associated to the same flexible substrate.

To the contrary, Pan has two flexible substrates. The structure of each fuel cell of Pan is obtained by coupling in a face-to-face relationship two “half-structures”, each of said “half-structures” being initially formed onto a respective flexible substrate. The Examiner refer to Fig. 2 of Pan: note that this figure is a schematic (longitudinal) section of a single fuel cell (see brief description of the drawings and the beginning of paragraph 26 of Pan).

This fuel cell 100 has two flexible substrates 101 and 102 assembled face-to-face together with a PEM 103 in between. On either side of the PEM 103 are porous material and catalyst layers 104. Adjacent to the porous material and catalyst layers 104 are anode and cathode electrodes 106 and 107. The liquid fuel 110 is provided on the anode side of the fuel cell 100 and has direct contact with the porous material layers 104 through openings 112 in right flex substrates 102. The cathode side of the fuel cell 100, i.e., flex substrate 101, is open to the atmosphere (through unmarked openings - refer to the arrow of reference 107), which serves to supply the oxygen to the fuel cell and carry away the reactant water vapor 111. Fuel enters the cell at the right side, whereas water is expelled at the left side: there is no other way to operate the fuel cell.

The Examiner is kindly requested to refer to the main claim of US 6,620,542, which is the US patent issued for the Pan reference (copy enclosed as Exhibit B). It is clear from such an issued claim that one of the flex substrates of Pan (i.e., the first substrate 102) “*comprises opening through which pass liquid fuel*” and the other one of the flex substrates of Pan (i.e., the second substrate 101) “*comprises opening through which pass water*”. Thus, in Pan, there is not a conduit for supplying liquid fuel and a conduit for emptying water associated to a same substrate.

Also, the fact remains that Fig. 2 shows a longitudinal section of a single fuel cell numbered with 100. The fuel cell stack of Pan (Pan calls the stack “*fuel cell assembly*”) is shown in top sectional view and plan view in Figures 3A and 3B. It is immediately apparent from these figures (and description thereof) that Pan does not have any ducts connecting the plurality of fuel cells forming the stack thereof.

On page 5 of the Office Action the Examiner refers to paragraph 26 of Pan and equates the first duct of claim 1 of the instant application to the opening 112 of Figure 2 of Pan. The Examiner does not have the perception that Figure 2 of Pan relates to a single fuel cell 100, not to fuel cell stack as required by claim 1 of the application in reference. In the solution of Pan, a single cell 100 has a plurality of opening 112 and the passage of Pan mentioned by the Examiner states that the liquid fuel is supplied to all portions of a single fuel cell, not all the cells of a stack.

In the rejection, the Examiner then repeats literally part of the disclosure of paragraph 31 of Pan, that the pores in the porous metal 104 layer may be oriented in the local plane, or substantially in the local plane defines by the flexible substrates. This has nothing to do with connecting a plurality of cells: this passage of Pan simply means that the porous metal layer 104 is to be found between the two substrates: the pores mentioned here are within a single fuel cell, since layer 104 is part of a single cell: thus, these pores cannot connect a plurality of cells to each other.

The Examiner finally states (again from paragraph 31 of Pan) that the pores of Pan may be further oriented such that the liquid will be transported in a specified direction within the pores metal layer so that the liquid reaches all, or substantially all, of the fuel cell side flex circuit. Here again, Pan is referring to **a single cell**: the porous layer 104 is a component of a single fuel cell, which do not extend through the whole stack, as it is immediately apparent from Figure 3A and 3B.

When the Examiner concludes that the duct 112 (i.e., openings) connects the fuel cell to each other, it is respectfully submitted that she is making an evident error. She is kindly invited

to attentively read Pan, and namely in connection with the manufacturing process described in Figs. 5A through 5E.

Applicant encloses a copy of Figs. 3A and 3B of Pan (Exhibit C), wherein some of the reference numerals of Fig. 2 are used. It is hoped this will assist the Examiner in understanding the structure of Pan and realizing that Pan does not have any ducts irremovably connected to one of the flexible substrates thereof, for connecting together a plurality of cells.

In view of the foregoing, it is believed that claim 1 patentably distinguishes over the prior art. Thus, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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